

2 minute Warm-up!

1. $\log_4 16 = 2$

2. $\log_4 64 = 3$

3. $\log_3 9 = 2$

4. $\log_3 \frac{1}{3} = -1$

5. $\log_2 32 = 5$

6. $\log_2 4 = 2$

7. $\log_5 \frac{1}{25} = -2$

8. $6^{\log_6 32} = 32$

9. $\log_4 x < 2 \Rightarrow 4^2 > x$

10. $\log_2 x > 3 \Rightarrow 2^3 < x$
 $x > 8$

10-3
Properties of Logs

$b > 0 \quad b \neq 1$

$m > 0 \quad n > 0$

1. $\log_b m \cdot n = \log_b m + \log_b n$

2. $\log_b m/n = \log_b m - \log_b n$

3. $\log_b m^p = p \cdot \log_b m$

Simplify.

ex

$2\log_{10} 5 + \log_{10} 4$

$\log_{10} 25 + \log_{10} 4$
 $\log_{10} 100$

(2)

ex

$2\log_3 6 - \log_3 4$

$\log_3 36 - \log_3 4$

$\log_3 9$

(2)

ex

$\log_4 40 - \log_4 5$

$\log_4 8 = y$

$4^y = 8$

$2^{2y} = 2^3$

$\left(\frac{3}{2}\right)$

ex

$$\log_4 3 - \log_4 48$$

$$\log_4 \frac{1}{16} = (-2)$$

$$4^4 = \frac{1}{16} = \frac{1}{4^2}$$

$$4^{-2}$$

Expand

ex

$$\log_6 m^2 n^3$$

$$\log_6 m^2 + \log_6 n^3$$

$$2\log_6 m + 3\log_6 n$$

Expand

ex

$$\log_4 \sqrt{\frac{m}{n^5}}$$

$$\frac{1}{2} \log_4 \frac{m}{n^5}$$

$$\frac{1}{2} (\log_4 m - 5\log_4 n)$$

Solve.

ex

$$\log_5 x = 3\log_5 2 + \log_5 7$$

$$\log_5 8 + \log_5 7$$

$$\log_5 x = \log_5 56$$

$$x = 56$$

Solve.

ex

$$\log_3 x = 2\log_3 3 + \log_3 5$$

$$\log_3 9 + \log_3 5$$

$$x = 45$$

Solve.

ex

$$\log_b (x+3) = \log_b 8 - \log_b 2$$

$$\log_b 4$$

$$x+3=4$$

$$x=1$$

Solve.

ex

$$\log_7(x+1) + \log_7(x-5) = 1$$

$$\log_7(x^2 - 4x - 5) = 1$$

$$\begin{aligned} 7^1 &= x^2 - 4x - 5 \\ 0 &= x^2 - 4x - 12 \\ &= (x-6)(x+2) \\ x &= 6 \quad x = -2 \end{aligned}$$

Given:

$$\begin{aligned} \log_3 7 &\approx 1.7712 \\ \log_3 2 &\approx 0.6310 \\ \log_3 3^p &= p \end{aligned}$$

ex

$$\log_3 54 \approx 3.6310$$

$$\begin{aligned} &\log_3 2 \cdot 27 \\ &\log_3 2 + \log_3 3^3 \\ &.6310 + 3 \\ &3.6310 \end{aligned}$$

ex

$$\log_3 .25$$

$$\begin{aligned} &\log_3 \frac{1}{4} \\ &= \log_3 2^{-2} \\ &= -2 \log_3 2 \\ &= -2(.6310) \\ &= -1.2620 \end{aligned}$$

Given:

$$\begin{aligned} \log_3 7 &\approx 1.7712 \\ \log_3 2 &\approx 0.6310 \\ \log_3 3^p &= p \end{aligned}$$

ex

$$\log_3 9/49$$

$$\begin{aligned} &\log_3 \frac{9}{49} \\ &= \log_3 3^2 - \log_3 7^2 \\ &= 2 - 2(1.7712) \\ &= -1.35424 \end{aligned}$$

Given:

$$\begin{aligned} \log_3 7 &\approx 1.7712 \\ \log_3 2 &\approx 0.6310 \\ \log_3 3^p &= p \end{aligned}$$

ex

$$\log_3 7/2$$

Given:

$$\begin{aligned} \log_3 7 &\approx 1.7712 \\ \log_3 2 &\approx 0.6310 \\ \log_3 3^p &= p \end{aligned}$$

ex

$$\log_3 18$$

$$\begin{aligned} &\log_3 9 + \log_3 2 \\ &= 2 \end{aligned}$$

Given:

$$\begin{aligned} \log_3 7 &\approx 1.7712 \\ \log_3 2 &\approx 0.6310 \\ \log_3 3^p &= p \end{aligned}$$

ex

$$\log_3 2/3$$

Given:

$$\log_3 7 \approx 1.7712$$

$$\log_3 2 \approx 0.6310$$

$$\log_3 3^p = p$$

HW

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13-27odd